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The project investigated the use of discriminate function analysis on students' performance in senior secondary school. And more importantly, to determine which of the variables: Mathematics, English, Biology, Physics and Chemistry discriminate between two groups of students who are (1) above average (2) below average with regard to predetermined classification on the basis of affective domain. Leadership private secondary school Damaturu was chosen because it has students from all geopolitical zones of the country. The research personnel considered sample of eighty five (85) students, where 61 of the students who performed above average on the basis of affective domain is taken as group A, while the remaining 24 students were taken as group B on the same basis and for each group, a corresponding continuous assessment in Mathematics, English, Physics, Biology and Chemistry was collected. The outcome of the test shown that English and Mathematics contributed more to the discriminate function and that, 131.9% of the variance is accounted for. Also, all the variables are significant at 0.01 level of significance which explains that 91.8% of the variables are correctly classified on the basis of affective domain by the teacher. This is further confirmed by chi-square test of independent at 0.01 significant level of 1 degree of freedom.

Classification of object is often done by use of statistical techniques which are built on decision theory and employ methods of data combination in one form or the other. Discriminant function analysis is one of such techniques which begin with desire to statistically distinguish between two or more groups or classes (Hassan, 1991). Just like an educational researcher who wants to investigate which variables discriminate between high school graduates who decide (1) to go to college, (2) to attend a trade or professional school, or (3) to see no further training' (or that purpose the researcher collect data on numerous variables prior to student's graduation. After graduation, most students will naturally fall into one of the three categories. Discriminant analysis could then be used to determine which variable(s) are the best predictors of student subsequent education choice (that is, soft, %, , !).

Another method of handling classification decision is by means of the multiple discriminant function. This determine how closely the individual's scores in a whole set of test approximate

the scores typical of persons in a given curriculum or occupational category. * person would then be assigned to the particular group he resembles most closely. (Hassan, 1971).

* According to empirical work undertaken by Hassan (1971) in a study of discrimination analysis of personality characteristics and occupational preference of Nigerian adolescents where number of discriminating variables were used in classifying respondents into one of four occupational categories namely farming trading, intermediate and professional. 21.23% of the grouped cases had their group membership correctly predicted.

Discriminant function analysis has two distinct purposes and procedures namely 4 for prediction and classification. In the prediction procedure, the linear discriminant functions are derived from a set of weighted independent variables which provide a predictive measure of the subject's group membership (Smith, 1969). Discriminant analysis is also much valued tool for market segmentation but, it has received much theoretical attention in the market literature (Dillion, 1969).

Discriminant function analysis can also be thought as multiple regressions when two groups are involved by using them as dependent variables. Result obtained would be similar to those we would obtain via discriminant analysis. (Taha, 2006).

In this study, focus is on student performance in terms of affective and cognitive ability of the students and to establish the relationship between them using continuous assessment as variables by the method of discriminant function analysis. This will further give room to verify the classification of students as above and below average based on affective ability.

The purpose of the study is to investigate the use of discriminant function analysis on students' performance.

The study is designed to find answer to the following questions

- Is there any relationship between students' performance and the explanatory variables?
- Are the parameters of the model significant?
- Is the classification of student based on the measure adopted justifiable?
- What is the general conclusion based on the findings?

This study is carried out to determine which of the variables Mathematics, English, Biology, Physics and Chemistry discriminate between two groups of students who are predetermined classified as (1) above average (2) below average on the basis of affective domain.

Total number of eighty five (85) students in 10% of the leadership category school whose performance in terms of continuous assessment in second term were collected from the school record. Fifty (50) of the students were identified as above average while remaining 35% of the

students were identified as below average. The identification was done by the teacher based on observation and experience on the ability of each student.

Using discriminant function analysis, the basic idea is to determine whether groups differ with regard to the mean of a variable and then use that variable to predict group membership. In addition, this study will not only consider the underlying basis of discriminant function analysis but further test theory by observing whether cases are correctly classified as predicted and to assess the relative importance of the independent variable for classification.

Research Question 1

Is there any relationship between students' performance and the explanatory variables?

Table 1: Eigenvalues

Function	Eigenvalues	% of Variance	Cumulative %	Canonical Correlation
1	1.319	100	100	0.754

The λ on group i.e. ratio of the between groups sum of squares to the within groups sum of squares, the value produced equals the eigenvalue.

i.e. $\lambda = \frac{SS_{\text{between-groups}}}{SS_{\text{within-groups}}}$

This value is the quantity of variance between groups maximized by the discriminant function coefficient and from table 1 the eigenvalue is 1.319. That is, 100% of the variances are accounted for.

The canonical correlation is given by

$$r = \sqrt{\frac{SS_{\text{between-groups}}}{SS_{\text{total}}}}$$

This measures the relationship between the groups formed by the dependent and the discriminant function. (From table 1 the value is given as 0.754 meaning there is a good relationship between them.

Research Question 2

Are the parameters of the model significant?

The linear discriminant equation is given as

$$\text{Group} = 0.1 > H, \dots, 0.6 I_1 H, \dots, 0.26 I_2 H, \dots, 0.1 I_3 H, \dots, 0.2 I_2$$

Table 2: Discriminant Function Coefficients

	Function
	1
Mathematics	0.047
English	0.057
Biology	0.044
Physics	-0.002
Chemistry	-0.005
(Constant)	-9.184

Group C (9.1) > H, > 6 I₁ H, > 26 I₂ H, > > I₁ H, > > I₂ H, > > I₁ H, > > I₂ H

- this is otherwise known as unstandardized discriminant coefficients used to maximize differences between groups.

- able to test of quality of Group means

	Wilks' Lambda	F	Df1	Df2	Sig.
Mathematics	0.612	52.697	1	83	0
English	0.559	65.486	1	83	0
Biology	0.65	44.705	1	83	0
Physics	0.779	23.559	1	83	0
Chemistry	0.787	22.416	1	83	0

- the Wilks' lambda is denoted by λ and is given by

$\lambda = \frac{SS_{\text{within}}}{SS_{\text{total}}}$

- this is used to test which independent variable contributes significantly to the discriminant function such that smaller the lambda for an independent variable, the more that variable contributes to the discriminant function. (from table & it could be seen that English (I₁) contribution is more followed by mathematics (I₂).

(furthermore, test at .01 significance level shows that each of the variables is significant and therefore concludes that all group means are not the same.

Research question &

Is the classification of student based on the measure adopted justifiable?

(from table > percent of cases correctly classified are given as)

7885=91.76%

-able >l Classification 7 results

		Predicted Group Membership		
		Group A	Group B	Total
Original Count	Group A	57	4	61
	Group B	3	21	24
%	Group A	93.4	6.6	100.0
	Group B	12.5	87.5	100.0

Chi +quare test of independent denoted by x2 is gi\$en by

$$x^2 = \sum \frac{(O-E)^2}{E}$$

$$x^2 = 54.33$$

- herefore, o\$erall correct classification was obser\$ed in 91.6/ 3 of the \$variables. - he obser\$ation was found to be significant at the ,.,1 (x2=54.22, df=1!. - hus, obser\$ed classification is significantly from e .pected chance classification.

- The results of the analysis show that there is a strong positive relationship between groups formed and discriminant function which however confirm how well the independent variables are significant in the groups classification.

In addition, test was carried out on variables which show that they significantly contributed to the correct classification of 91.6% of the variable. This is again further confirmed by chi square test of independence that observed classification is significantly different from expected chance classification at .05 level of significant.

- The results of the analysis show that there is a strong positive relationship between groups formed and discriminant function which however confirm how well the independent variables are significant in the groups classification.

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- This means that class teacher plays a unique role in ensuring proper education growth and progress of students. To achieve this goal in an indisputable manner the use of both tests affective ability, cognitive ability etc. must go in line simultaneously. These will in turn demonstrate students capabilities in learning situation and it will also serve as aids to the teacher in identifying students who are actually good, weak, poor students and correct measures to apply. However, the result of the analysis showed that 91.6% of the cases were correctly classified. Meaning that 91.6% of the students were classified to the group they actually belong to in terms of their general performance.

- The analysis reveal that it is not enough to generalize the performance of students on the basis of single assessment either affective ability otherwise called psychological test or cognitive ability known as continuous assessment. Therefore, it is imperative that both tests should be accorded serious attention in judging students performance.

* So government should formulate a national policy that will give adequate attention to the affective ability as in the case of cognitive ability so that student can be classified into curricular categories where they can performance best.

Parents and custodian are not left out in situation they should make effort in providing necessary materials for their wards because these materials actually contribute to the enhancement of student performance.

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